

## 2.0 WILDLIFE-RELATED MOTOR VEHICLE ACCIDENT FACTORS

### 2.1 Identifying Factors

The highway environment in British Columbia is a very complex and varied one, ranging from multi-lane freeways located in urban centres to two-lane highways transecting the undeveloped hinterland. British Columbia has a diverse number of wild animal species and there are 133 native and 9 introduced species of mammals in the Province, ranging from seemingly ubiquitous deer to elusive wolves, each with their own highway interaction characteristics. Wildlife-related motor vehicle accidents have been recorded on highways throughout the Province. There are many related and unrelated, man-made and natural factors which may influence drivers and wildlife interactions, and affect highway conditions. Some of the factors identified, many difficult to measure and evaluate, are listed in Table 2.1.

**Table 2.1 Wildlife-related Motor Vehicle Accident Factors** (adapted from Sielecki, 2001A, 2004)

|   |   |
|---|---|
| 1. Wildlife Characteristics               | species, population, age, sex, stage of reproduction, nutritional needs, movement behavior, population cycles                               |
| 2. Wildlife Activities                    | feeding, breeding, sleeping, migrating, evading predators, chasing prey   |
| 3. Natural Water Sources                  | intermittent and permanent streams, rivers, sloughs, lakes, ponds, springs, waterfalls  |
| 4. Man-made Water Sources                 | settling ponds, surface drainage systems, wells, dugouts  |
| 5. Natural Food Sources                   | natural vegetation, salt licks, fish-bearing waters, prey   |
| 6. Man-made Food Sources                  | orchards, gardens, fields, pets, livestock, garbage   |
| 7. Wildlife Shelter                       | caves, cliffs, forests, culverts, bridges   |
| 8. Habitat Conditions                     | seasonal vegetation changes, snow depth, drought, flooding, wildfire, overgrazing   |
| 9. Traffic                                | volume, speed, composition, time-of-day, time-of-year   |
| 10. Vehicles                              | size, design, operating condition, brakes, lights, horns  |
| 11. Drivers                               | wildlife hazard awareness, highway familiarity, general alertness, driving skill, response time, response actions                           |
| 12. Highway Design                        | road width, number of lanes, curvilinearity of alignment, right-of-way width, shoulder width, ditch depth, pavement surface, lighting       |
| 13. Roadside Management and Maintenance   | native and non-native right-of-way vegetation, weed control, mowing, brushing, ditching, snow removal, de-icing, sign and reflector repairs |
| 14. Roadside Development                  | natural, urban, suburban, rural   |
| 15. Accident Mitigation Devices           | wildlife signs, fencing, under/overpasses, reflectors   |
| 16. Topography                            | elevation, cliffs, slopes, plains, undulating terrain   |
| 17. Weather                               | rain, snow, sleet, fog, haze, smoke, wind, cloud cover  |
| 18. Time of Day                           | dawn, day, dusk, night, length of day/night   |
| 19. Lunar Cycle                           | phases of the Moon, intensity of moonlight  |
| 20. Human Activities Outside Right-of-Way | construction, forestry, farming, mining, hunting, off-road recreation, controlled forest and grass fires                                    |

The most important factors influencing the incidence of wildlife-related motor vehicle accidents appear to be animal populations and their locations relative to highways. The population of any species will generally rise and fall in relation to their food supplies, the number of its predators, and the number of other species its predators can also prey upon. The location is also dependent on food supplies, predators and other competing species, as well as climate (i.e. snow depth) and other critical lifecycle needs (i.e. shelter for pregnant females and newly born offspring).

While natural population expansions and contractions occur with cyclical repetition, useful accurate information on wildlife is usually not available as the dynamics of population cycles of animals in the wild are complex (Cooper, 1998).

Detailed information regarding wildlife locations and movement behavior is also often unavailable in remote or undeveloped locations.

The Ministry recognizes the need for accurate and timely information on wildlife.

Consequently, before the construction of new highways or the major upgrading of existing ones occurs, the Ministry's environmental staff, aided by wildlife consultants, conduct extensive, long term, wildlife counts and tracking to locate, identify, and quantify species, as well as determine movement patterns. Depending on the species, tracking may include radio-collaring over extended periods of time.

For day-to-day operations, general information on specific species of wildlife can often be found in materials developed by various wildlife agencies. For BCMoT, the Biodiversity Branch, British Columbia Ministry of Environment has been a vital source of expertise on various wildlife species. However, to improve reporting, BCMoT has published a wildlife roadkill identification guide (Sielecki, 2008).

A number of species found on British Columbia highways are profiled here. These profiles are intended to provide a general description on the appearance, life history, abundance and distribution of each animal for a better insight into their interaction with highways. The more common animals profiled are:

- |                                       |  |   |                          |
|---------------------------------------|--|---|--------------------------|
| 1. Bear (Black Bear and Grizzly Bear) | 4. Coyote  | Elk and Rocky Mountain Elk                                    | 8. Porcupine             |
| 2. Caribou (Woodland Caribou)         | 5. Deer (Mule Deer, Black-tailed Deer and White-tailed Deer) | 7. Moose (Alaskan Moose, Northwestern Moose and Shiras Moose) | 9. Sheep (Bighorn Sheep) |
| 3. Cougar                             | 6. Elk (Roosevelt)   |   | 10. Wolf                 |

The rarer animals profiled are: 1) Badger and 2) Bison



*Deer capture*

(Photo: Mike Kent)



*Radio collar on a deer*

(Photo: Mike Kent)





## 2.2 Black Bear (*Ursus americanus*: ssp: *altifrontalis*, *carlottae*, *cinnamomum*, *kermodei*, *vancouveri*)

### Appearance and Size

Black bears have a bulky body, small black eyes, a broad head, rounded ears, a short tail, and a fine, long hairy covering. Usually, their fur is uniformly black, except for a tan muzzle and a white “V” on the chest. Black bears can range in colour from black to white, with cinnamon, brown and blonde not being uncommon. A blue-coloured black bear or “glacier” bear is rare. Adult size and weight varies greatly according to sex, season, food supply, and geographic area. Adult males measure about 60 cm to 90 cm in shoulder height and 130 cm to 190 cm in length and weigh 80 kg to 300 kg. Females are smaller, weighing 40 kg to 140 kg.



(Photo: Tourism BC)

### Life History

Black bears have low reproductive rates compared to many other mammals. Females typically do not reach sexual maturity until four years of age and breed only every two to three years after that. Where food is scarce, females might not bear their first litter until they are six or seven years old. Most males don't mature sexually until age five or six. Although black bears can live for 25 to 30 years in captivity, their life-span in the wild is usually much shorter. Black bears in British Columbia usually mate from early June to mid-July. Cubs are born in January or February, during hibernation. While litter sizes vary from one to five, black bears usually have two cubs. Cubs nurse while the mother continues hibernating and weigh 3 kg to 5 kg when they leave the den in spring. Cubs stay with their mother their entire first year and sometimes longer. For bears hibernation is an



(Photo: Tourism BC)



(Photo: Bryan Harry)



(Photo: BC Parks)

important survival strategy, where their main foods, green vegetation, berries, salmon and insects are not available in winter. Black bears usually hibernate for three to five months on the south coast and for longer periods (probably five to seven months) in the interior and the north. Females, in particular pregnant ones, hibernate longer than males.



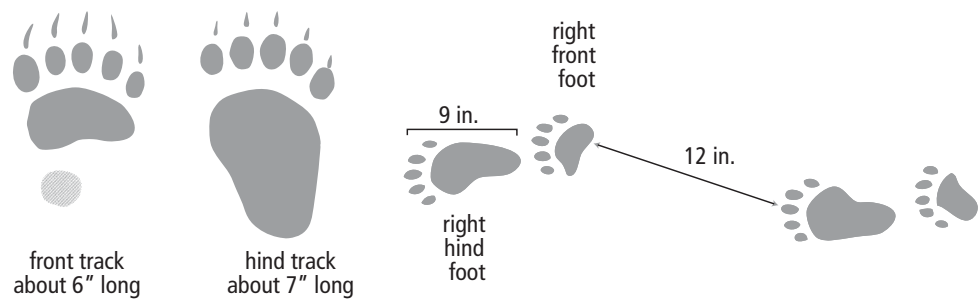
## Abundance and Distribution

British Columbia supports one of the largest populations of black bears in North America. Black bear numbers vary from year to year but their population in British Columbia is estimated to be between 120,000 and 160,000 bears. This is about one quarter of all black bears in Canada. One of the most widely distributed mammals in British Columbia, the black bear is found in forestland across the province. Its natural range includes Vancouver Island and most coastal islands to the north, including the Queen Charlottes. Although bears are generally absent from alpine, grassland, and heavily settled landscapes, they often are found close to the fringes of communities and sometimes wander into them. Bear numbers are higher in wet climatic zones, where vegetation is more plentiful, than in dry regions. Coastal bear densities are higher because of access to spawning salmon.

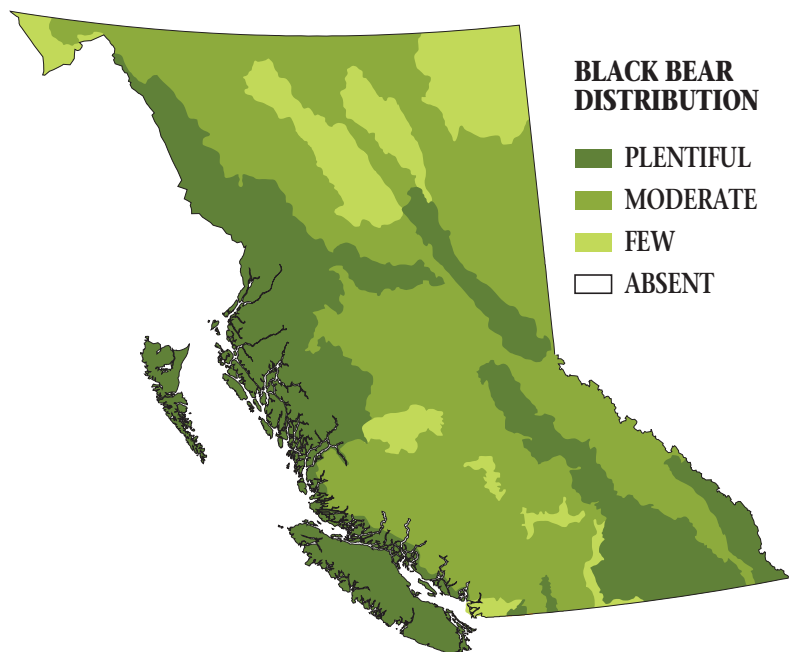


(Photo: R. Robinson)

Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2001, *Black Bears in British Columbia*, Victoria, 6pp.



**Map 2.1**



## 2.3 Grizzly Bear (*Ursus arctos horribilis*)

### Appearance and Size

Grizzlies are large, heavy-bodied bears that can weigh up to 680 kg, with the average weight ranging from 270 kg to 360 kg. Average adult grizzlies reach nose-to-tail lengths of 1.8 m but have been recorded as long as 2.7 m. The long, outer guard hairs of the grizzly are often



(Photo: Dave Dickson – ICBC)

tipped with white, silver, or cream giving the bear the grizzled appearance its name denotes. Coat colour can be various shades of blond, brown, black, or a combination of these, and can be affected by spring shedding, growth of new hair, nutrition, and climate. Coat colour is not a good characteristic for distinguishing between black bears and Grizzly Bears. Black bears and grizzly bears sometimes look similar, but grizzlies are usually larger and are seldom completely black. Grizzlies

have a prominent shoulder hump, which is lacking in black bears, and a dish-shaped face instead of the straight facial profile of the black. Grizzlies have much longer claws, adapted for digging, while black bears have shorter, curved claws, well suited for tree climbing.

### Life History

Grizzly bears have one of the lowest reproductive rates of North American terrestrial mammals. Females reach reproductive maturity between four and seven years of age, and once mature, normally produce young every two to three years. The breeding season begins in late May and lasts until mid-July. The gestation period is relatively short (7 to 9 months). One to four, usually two, cubs are born in the den in January or February. The cubs will remain with the female for two or three years, during which time she does not breed. Grizzlies rarely live past the age of 25.



(Photo: Tourism BC)



(Photo: ICBC)



(Photo: BC Parks)



## Abundance and Distribution

Grizzly Bears inhabit most of the province except the Queen Charlotte Islands, the Lower Mainland, and portions of the south-central interior. While they are not common on Vancouver Island, a cub was found on the northern end of the island in 2003. Grizzly Bears



(Photo: Jim Peaco, US National Park Service)

occur in all major biogeoclimatic areas and utilize habitats ranging from coastal estuaries to alpine meadows. Habitat use is primarily influenced by the presence of food, denning and mating sites, and other bears. Home ranges vary in size depending on the individual bear and the locality, ranging from less than fifty to hundreds of square kilometres. Coastal bears tend to have smaller home ranges than do interior bears. Home ranges of males are generally larger than those of females. Given their secretive nature, affinity for wilderness areas

and low population densities, accurate counts of Grizzly Bear populations are almost impossible. Current estimates put the B.C. population at about 10,000 bears, approximately one-quarter of the North American population.

Adapted from: British Columbia Ministry of Environment, Lands and Parks, 1994, *Grizzly Bears in British Columbia*, Victoria, 6pp.



(Photo: US National Park Service)



front track  
about 10" long



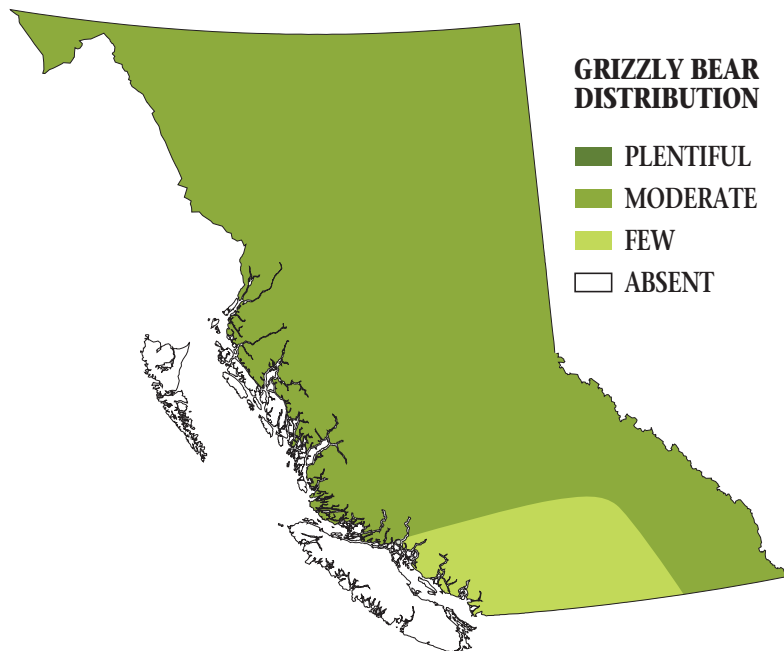
hind track  
about 12" long



walking tracks



**Map 2.2**



## 2.4 Woodland Caribou (*Rangifer tarandus caribou*)

### Appearance and Size

Woodland Caribou are classified into three ecotypes: Mountain, Northern and Boreal. The ecotypes look about the same but differ with behavior, habitat use, distribution and migration. Woodland Caribou have soft medium brown coats, but their colour pales as guard hairs break and fade during winter. In males, the head and neck are often white or greyish-white, with a mane on the underside of the neck. The tail and rump area, as well as a band around each hoof, are also whitish. Their long dense winter coat provides effective insulation against low temperatures and high winds. Caribou have erect, spreading antlers. Males have a flattened (palmate) brow tine that points down over the forehead. Female Caribou also have antlers, which is unique among females in the deer family. Woodland Caribou can range in height at the shoulder from 100 cm to 120 cm. Males typically weigh 180 kg to 270 kg while females usually weigh about 90 to 135 kg.



(Photo: BC Ministry of Forests)



(Photo: BC Parks)

### Life History



(Photo: Mike Fenger)

The breeding season is much shorter for Caribou than for other deer. The majority of the breeding occurs in a one-week period in the middle of October. Gestation averages seven to eight months, and calves are born in late May to early June. To avoid predators, pregnant females seek secluded sites in alpine and subalpine habitats. Single births are the most common, and females usually give birth to their first calf when they are three years old. Caribou calves are dark brown and have no spots. They are probably the most precocious of the deer family; calves must be up and travelling with their cows almost immediately in order to avoid predators. Generally, females live 10 to 15 years while males live 8 to 12 years.



(Stock photo)



## Abundance and Distribution

Woodland Caribou occur east of the Coast Mountains, from the Yukon border south to the Itcha-Ilgachuz in the Western Chilcotin, eastwards to the foothills of the northern Rocky Mountains; in the Cariboo, Selkirk, Purcell, and Monashee mountains in the southeast; and throughout the highlands and plateaus (e.g. Spatsizi, Omineca) in the northern and central interior. Caribou occupy about 85 percent of their historic distribution in British Columbia.

Mountain Caribou occupy about 60 percent of their historic range. Mountain Caribou may make four migrations each year, moving down to lower elevations in early winter, back up to higher elevations in late winter, down to lower elevations again in spring, and finally back to high elevations for the summer. The range of movement up and down varies, however, and the deepest snow areas, such as Revelstoke, usually have the widest range of vertical migrations. Northern Caribou migrate twice a year, traveling more than 140 km in some cases. The migration patterns of Boreal Caribou are largely unknown. British Columbia has about 16,500 Caribou.

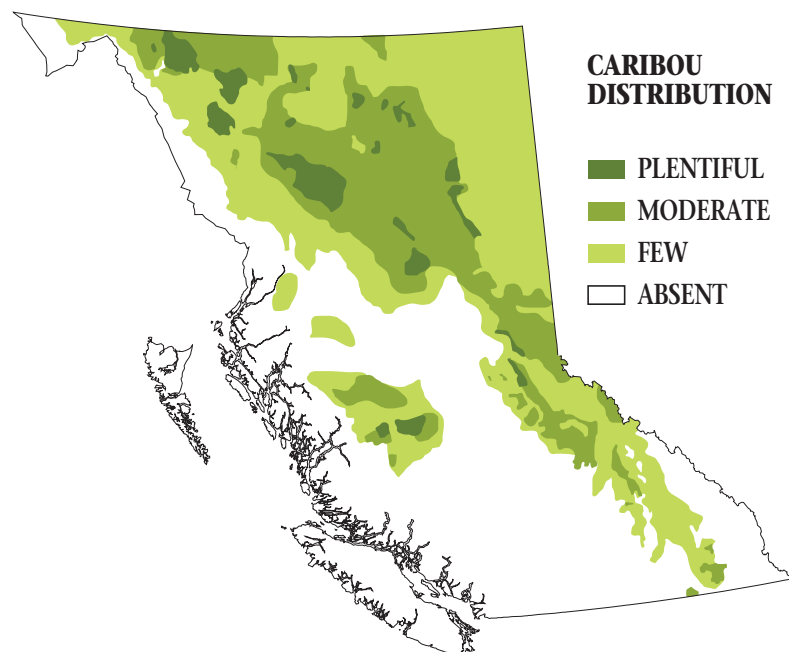


(Photo: BC Ministry of Transportation and Infrastructure)

Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *Caribou in British Columbia*, Victoria, 6pp.



**Map 2.3**



## 2.5 Cougar (*Puma concolor: ssp: oregonensis, missoulensis, vancouverensis*)

### Appearance and Size

In British Columbia, the average adult male weighs about 46 kg and the average adult female weighs about 37 kg. Several cougar taken have weighed between 70 kg and 78 kg. Large adult males may measure 2.7 m in length, including a 76 cm tail. The fur is short and ranges in colour from reddish-brown to a grey-brown, with light underparts. Very young kittens are spotted, with ringed tails. This coloration is gradually lost as young cougar reach adulthood. Adults are unmarked. One black cougar was reported several years ago in the North Okanagan area, while white or very light-coloured cougar are infrequently reported.

### Life History

Cougar are polygamous and only the female tends the young. Females reach sexual maturity at 2 to 3 years of age. Breeding takes place at any time of the year, and one to six kittens are born after a gestation period of about 3 months. The female gives birth to her young in a rocky crevice or den, protected by roots or windfalls. Kittens are born with their eyes closed, but these open 10 to 14 days after birth. The kittens nurse for at least five to six weeks. Kittens will take meat at about six weeks of age.



(Stock photo)



(Photo: W.L. Miller)



(Photo: BC Parks)

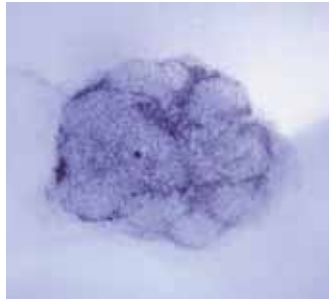


(Photo: BC Parks)



## Abundance and Distribution

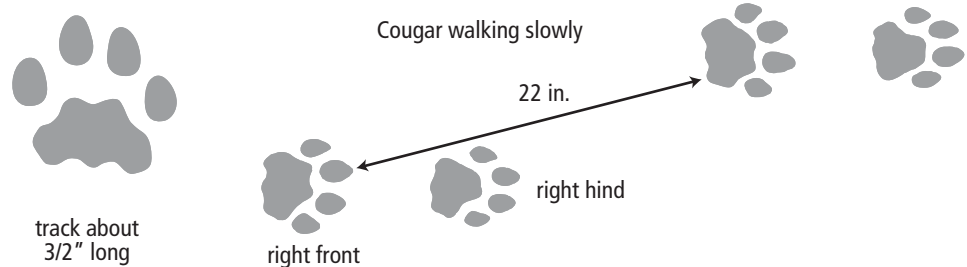
Cougar are found throughout British Columbia. Distribution extends north from the United States/British Columbia border to the Big Muddy River on the Alaska Highway, south of about 54 degrees latitude; and from the British Columbia-Alberta border west, to and including, most coastal islands. To date, cougar have not reached the Queen Charlotte Islands. The territory or home range maintained by individual adult cougar ranges up to, or greater than, 260 km<sup>2</sup>. The female cougar maintain winter territories of 13 km<sup>2</sup> to 52 km<sup>2</sup>. Females with kittens require larger ranges than females without kittens, and some overlap of female ranges occurs. Males occupy larger territories, in the range of 65 km. Resident males do not overlap ranges. Transient cougars move through occupied ranges, but avoid resident cougar. Cougar distribution is governed by the distribution of deer, its major prey species. Summer observations are scanty, but as the snow recedes cougar probably spread out from the lower



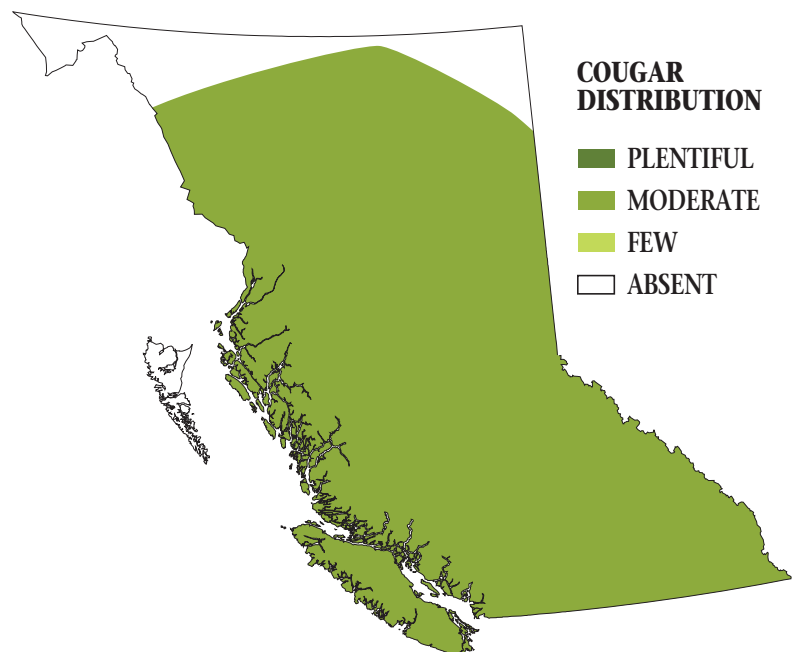
(Photo: Jim Peaco, US National Park Service)

slopes and valley bottoms to inhabit virtually all elevations within their general distributional boundaries. During winter months, cougar follow deer down to the lower elevations. Cougar seem to prefer the rough, rocky, semi-open areas surrounding the major deer winter ranges in the Interior, but they do not confine their activities exclusively to this type of habitat. Cougar can be found anywhere within a game winter range.

Adapted from: British Columbia Ministry of Environment, Lands and Parks, 1994, *Cougar in British Columbia*, Victoria, 6pp.



**Map 2.4**



## 2.6 Coyote (*Canis latrans* Say: *ssp: incolatus, lestes*)

### Appearance and Size

Coyote fur is generally a tawny grey, darker on the hind part of the back where the black-tipped hair becomes wavy. Legs, paws, muzzle, and the back of the ears are more yellowish in colour; the throat, belly, and the insides of the ears are whiter. The tail, darker on top



(Stock Photo)

and lighter on the underside, is lightly fawn-coloured towards the tip, which is black. The coyote's fur is long and soft and well suited to protect it from the cold. Because it is light-coloured in winter and dark in summer, it blends well with the seasonal surroundings. The coyote's ears are wide, pointed, and erect. It has a tapering muzzle and a black nose. Unlike most dogs, the top of the muzzle on coyotes forms an almost continuous line with the forehead. The yellow, slightly slanting eyes, with their black round pupils, give the coyote a characteristic expression of cunning. The canine, or pointed, teeth are remarkably long and can inflict serious wounds. The neck is well furred and looks oversized for the body. The typical male coyote weighs from 9 kg to 23 kg, has an overall length of 120 cm to 150 cm, including a 30 cm to 40 cm tail, and stands 58 cm to 66 cm high at the shoulder. The female is usually four-fifths as large.

### Life History

Coyotes appear to be monogamous, and couples may remain together for several years. Both sexes can breed at one year of age under good conditions, although both sexes usually breed somewhat later



(Photo: Bryan Harry, US National Park Service)

in life. The

mating occurs mainly during February and March. Gestation lasts from 2 months. On average, the female bears three to seven pups, covered with fine brown fur, whose eyes remain closed for the first eight or nine days. Weaning, or making the transition from the mother's milk to other food, begins about one month after birth. The adults then feed the pups by regurgitating half-digested food. At about three weeks of age, the pups begin to romp around under the adults' watchful supervision. When fall comes, the young coyotes may leave their parents to claim their own territory. If there is an abundant food supply, pups may stay with the adults to form packs, or clans.



(Photo: BC Parks)



(Photo: Jim Peaco, US National Park Service)



## Abundance and Distribution

The coyote is one of the few mammals whose range is increasing, despite extensive persecution by people. In British Columbia, the coyote still inhabits its traditional habitats, the aspen parkland and short- and mixed-grass prairie in the Peace River. However, it has spread south and west into the mountains, and the southern and northern Interior. Coyotes are now found even in urban centres on the British Columbia Mainland, including Vancouver.

Adapted from: Canadian Wildlife Service, 1990, *Hinterland Who's Who, Mammals: Coyote*, Ottawa, Ontario



(Stock Photo)

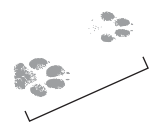


front track  
about  
2 3/4" long

In this trail pattern of a coyote in a trot, the larger front tracks are all on one side (at bottom) and the hind tracks are above.

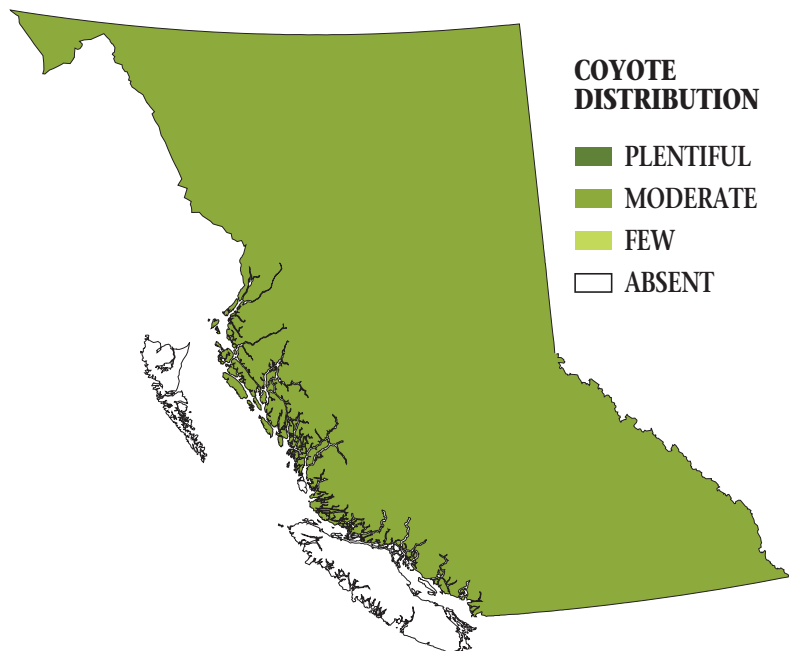


22" to 30"



6 1/2" to 13 1/4"

Map 2.5



## 2.7 Mule and Black-tailed Deer (*Odocoileus hemionus*: ssp: *columbianus*, *hemionus*, *sitkensis*)

### Appearance and Size

Mule Deer have a reddish brown coat that changes from tawny brown in summer to dark or grizzled brown in winter. They have a dark brown forehead, a whitish face with a black muzzle, and a white throat patch. Their ears are large, about two-thirds the length of the



(Photo: Ed Austin & Herb Jones, US National Park Service)

head, with black borders and white hair on the inside. They have a large white rump patch with a narrow black-tipped tail. Each year male Mule Deer grow and shed a set of antlers. Their antlers have two main beams, each of which forks again into two beams (dichotomous branching). Mule Deer attain heights of 90 cm to 95 cm high at the shoulder. While most adult males, or bucks, weigh 68 kg to 113 kg, some may reach 180 kg. Females, or does, usually weigh between 50 kg to 75 kg. Blacktails are smaller than

Mule Deer and slightly darker in color, with a small rump patch and a tail that is dark brown or black for most of its length. Adult males in good condition weigh between 48 kg to 90 kg, while females weigh between 40 kg to 65 kg. Sitka blacktails tend to be smaller and darker than Columbia blacktails.

### Life History

Deer are a very prolific species. Mating (rutting) occurs in late autumn, November and December. This is a time when bucks increase their displays of dominance and mature bucks engage in battles for females. Bucks are capable of breeding as yearlings, but older bucks do most of the mating. After a six to seven month long gestation period, fawns are born from late May through June. While young does often only have one fawn, twin fawns are the rule, and triplets do occur. Does usually produce offspring throughout their lives. More than 90 percent of does produce fawns every year. Usually, 45 to 70 percent of fawns die and few Black-tailed and Mule deer live more than eight to ten years.



(Photo: Condon, US National Park Service)



(Photo: BC Parks)



## Abundance and Distribution

Except for the rut, most Black-tailed and Mule deer tend to travel alone or in small groups. Black-tailed Deer numbers vary greatly depending on habitat conditions, winter severity, and predators numbers. Deer have adapted to all climates. They inhabit every kind of ecological zone, from alpine to valley bottom, and from dense coastal rainforests to dry interior rangelands. Deer population



(Photo: Ron Shade, US National Park Service)

in recent decades has ranged between 150,000 and 300,000. Blacktails are abundant in southern areas where the climate is favourable such as Vancouver Island, the islands in Georgia Strait, and the Sechelt Peninsula. Their numbers decline northward along the mainland coast. About 150,000 black-tailed deer inhabit the coastal areas of B.C. Sitka blacktails were introduced into the Queen Charlotte Islands in the early 1900's and have flourished there. About 165,000 Mule Deer inhabit the interior of the province. While most prefer the dry valleys and plateaus of the southern interior, Mule Deer are common in the south-central interior. About 20,000 to 25,000 occupy northern ranges.

Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *Mule and Black-tailed Deer in British Columbia*, Victoria, 6pp.



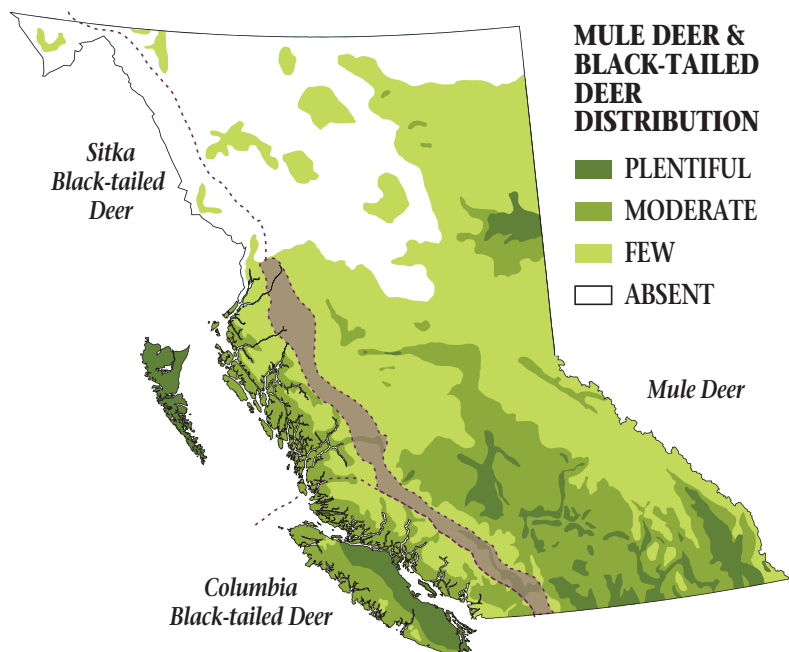
track about  
2 3/4" long



stotting group



**Map 2.6**



## 2.8 White-tailed Deer (*Odocoileus virginianus*: ssp: *dacotensis*, *ochrourus*)

### Appearance and Size

White-tailed Deer have a coat mostly reddish brown in summer but which changes to grey or greyish-brown in winter, with a contrasting white hairy covering on the belly, inside of the legs, underside of the tail, around the eyes, and on the chin and throat. The most striking feature of this deer, and the source of its name, is its triangular foot-long tail. On top, the tail is brown with a prominent white fringe, but the underside is snowy white. Whitetail bucks have distinctive antlers that fall off and grow back every year. Each antler has a main beam that rises from the top of the head, curves slightly backward, then turns out and forward over the face. Each main beam holds one to several unbranched tines, or points. Male fawns have no visible antlers, but yearlings may have either a single spike or antlers with four to eight tines. Older bucks always have several tines. Mature, White-tailed Deer stand about 90 cm tall at the shoulder. Adult males, or bucks typically weigh 68 kg to 102 kg. Adult females, or does weigh 45 kg to 73 kg. Weights vary considerably depending on age, the season, and the condition of the range.



(Photo: Wisconsin Dept. of Natural Resources)



(Photo: BC Parks)

### Life History



(Stock Photo)

Mating (rutting) occurs in the Fall, peaking in November when most does come into heat. During the rut, bucks travel incessantly. Most breeding involves yearlings and older animals. The gestation period for White-tailed Deer is about six to seven months. After the gestation period, does drive off their young of the previous year and give birth to new fawns. Most fawns are born in late May or June. Twin births are common, but single births and triple births are not uncommon. While some whitetails live more than 20 years, few survive more than ten. Most bucks in hunted herds are less than four years old.



(Photo: Wisconsin Dept. of Natural Resources)



## Abundance and Distribution

In good years, White-tailed Deer numbers may exceed 65,000 in British Columbia. Whitetails are at the far northern edge of their vast North American range and many of them die during severe winters here. However, they come back in increasing numbers if several mild winters occur in a row. This pattern is most pronounced in the Peace River region. The White-tailed Deer does not occur everywhere in British Columbia. They are most abundant along valley bottoms in the Kootenay and Okanagan regions, particularly near the US border. In the North, they are most numerous along the Peace River and the lower reaches of tributaries like the Halfway, Beatton, Moberly, Pine, and Kiskatinaw Rivers. For most of the year, valley bottoms are the main habitat for White-tailed Deer in British Columbia. In the East Kootenay area, deer find winter range on south- to southwest-facing slopes and on fans and terraces where shrub stands have developed after wildfires, logging, or land-clearing for agriculture. The distribution of Whitetailed Deer is largely governed by climate, particularly snow depth.

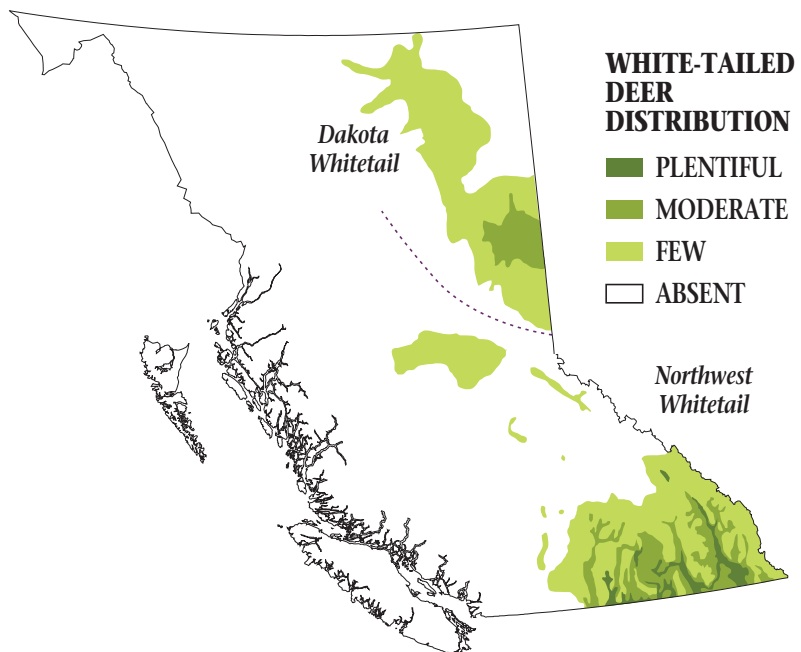


(Photo: Wisconsin Dept. of Natural Resources)

Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *White-tailed Deer in British Columbia*, Victoria, 6pp.



**Map 2.7**



## 2.9 Roosevelt Elk & Rocky Mountain Elk (*Cervus elaphus nelsoni*, *Cervus elaphus roosevelti*)

### Appearance and Size

Elk have distinct winter and summer coats. In winter, the head, neck, and legs are dark brown, and the sides and back are a much lighter gray-brown. Adult males (bulls) tend to have a lighter, creamier body colour than adult females (cows). In summer, the coat is a rich



(Photo: Dave Dickson, ICBC)

reddish-brown, with little or no undercoat. Both sexes have heavy dark manes and a yellowish-white rump patch bordered by a dark brown or black stripe. Adult bull Elk stand about 140 cm high at the shoulder and weigh 265 kg to 410 kg. Cows stand about 130 cm high and weigh 190 kg to 270 kg. Roosevelt Elk and Rocky Mountain Elk look quite similar but Roosevelt Elk are slightly larger and darker. Mature bull Elk have

### Life History

Elk are social animals. Up to 20 or more cows, calves, and yearlings live in groups that remain apart from the smaller groups of bulls, except during the autumn mating (rutting) period. As the mid-September rutting period approaches, bull Elk become more active and aggressive. They seek out the cow groups and establish



(Photo: J. Schmidt, US National Park Service)



(Photo: US National Park Service)

harems of several cows that they jealously herd and guard. Most cows are bred from mid to late September. Elk have a gestation period of eight months. Calves are born in late May and early June. Single births are most common and twins are rare. While Elk can live as long as 20 years, most die by age 10 or 12.



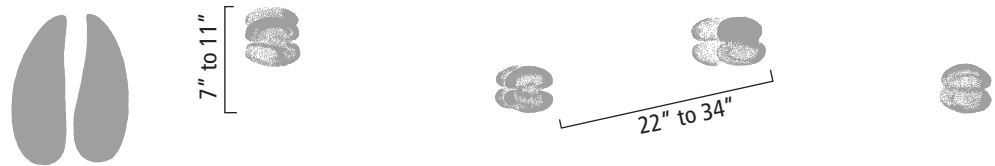
(Photo: BC Parks)



## Abundance and Distribution

While Elk usually live in mountainous areas, they occur both in the dense coastal old-growth rainforests and grassy interior valleys with scattered tree cover, keeping to areas where winter snows remain shallow. There are about 45,000 Rocky Mountain Elk in the British Columbia interior. About 15,000 occur in northern BC, 25,000 in the Kootenay region and 1000 in the Thompson-Okanagan area. A few hundred occur in other scattered herds. Elk are most numerous in the east and west Kootenay regions north to about Golden and west to Grand Forks. Native populations also occur along the east slope of the Rockies and adjacent foothills from the Wapiti River drainage to the Liard River, with a major concentration in the Muskwa and Tuchodi River areas. Since 1917, transplants, some from outside the province, have altered Elk distribution, supplementing some existing populations and resulting in new herds in several locations: southern Vancouver Island, the Queen Charlotte Islands, the Sechelt Peninsula, Powell River, Princeton, Lytton, Okanagan Lake, Granby River, Lower Arrow Lake, Williston Lake, and the Kechika River valley. About 3,000 to 3,500 Roosevelt Elk are located on Vancouver Island, with small herds in Phillips Arm, Sechelt and Powell River.

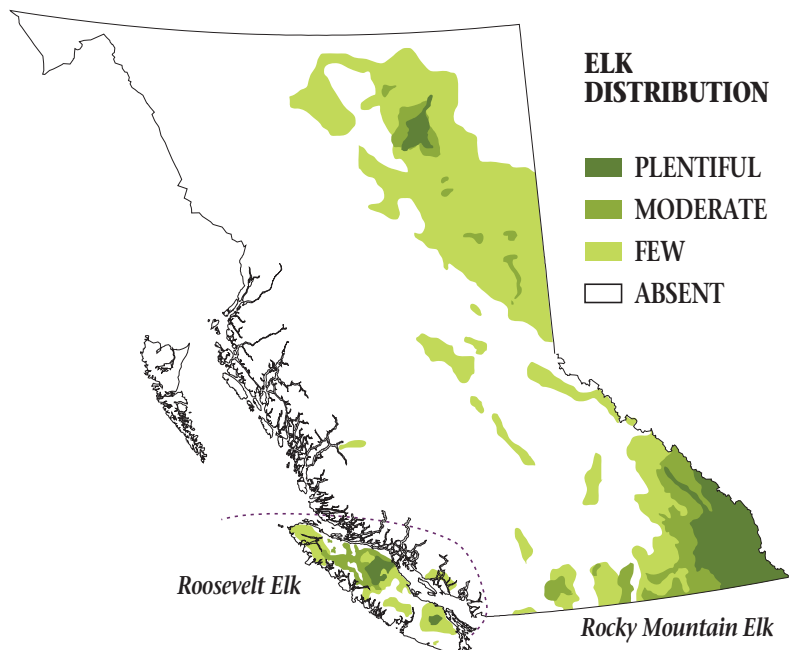
Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *Elk in British Columbia*, Victoria, 6pp.



track about  
4 1/2" long

The elk's walking pattern is usually a double register. The hind track often has a slight lead in the overlap of the front track

**Map 2.8**



## 2.10 Alaskan Moose, Northwestern Moose and Shiras Moose

(*Alces alces*: ssp: *andersoni*, *gigas*, *shirasi*)

### Appearance and Size

All three moose subspecies found in British Columbia are similar in appearance. The biggest moose live in northern B.C. while the smallest ones live in the southeast. Adult bulls stand nearly 2 m tall at the shoulder and have the most massive antlers of any member of the deer family.



(Photo: Jeff Foott, US National Park Service)

They are larger and have longer legs, a shoulder hump, and a dark brown to blackish coat. They have no rump patch, but they have a bell of skin and hair under the throat and a large, overhanging upper lip. Adult cows weigh on average about 340 kg to 420 kg; adult bulls weigh 450 kg to 500 kg. The maximum recorded weight is 595 kg. Moose have long legs to help them travel through fallen timber, muskeg, and deep snow. Their winter coat of long guard hairs and undercoat of fine wool allows them to survive in cold climate.

### Life History

Moose are essentially solitary animals. Their only lasting social bond is the bond between mother and calf, which lasts for only a year. During that time the cows protect the calves from predators and lead them to the best habitats. In expansive northern shrublands, Moose commonly form groups of up to eight to ten during the rutting period. This habit is less common in forested habitats. Moose mate from September to November, but more than



(Photo: BC Parks)



(Photo: Sgt. Joshua Strang)



(Photo: US National Park Service)

80 percent of calves are conceived during two weeks in late September and early October. Moose have a gestation of about eight months. In late May and June, the birthing period approaches and pregnant females seek seclusion and chase away their young of the previous year. Under normal conditions, single births are generally most common. The proportion of adult cows that produce twins is closely associated with their nutritional condition.



(Photo: BC Parks)



## Abundance and Distribution

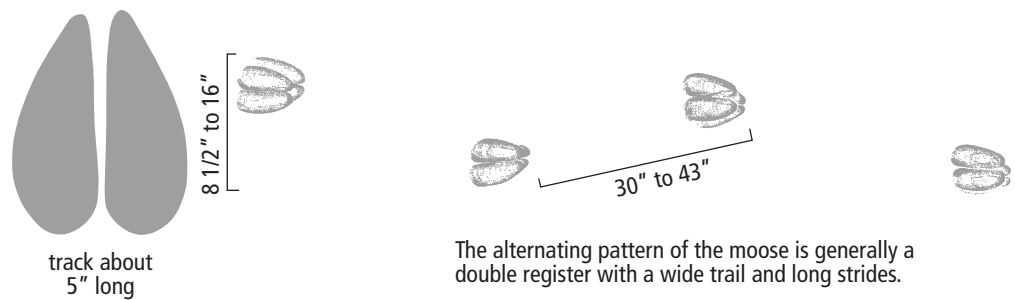
Moose are one of the most widely distributed ungulates in British Columbia. Found across almost the entire interior of the province, they are most abundant in the central and sub-boreal interior, the northern boreal mountains, and the boreal plains of northeastern British Columbia. Moose are also common in mountainous valleys, except for a few dry southern valleys like the Thompson and Okanagan. Moose are not found on Vancouver Island and are usually absent from the coastal regions, but they penetrate as far as the tidewater at the heads of several inlets from Bute Inlet northward. British Columbia is estimated to have about 175,000 Moose.

Over 70 percent live in northern British Columbia and the rest in the Cariboo-Chilcotin, Thompson-Okanagan, and Kootenay regions. Population densities vary greatly from place to place, mostly in response to snow depth and the supply of winter browse. Moose move about within familiar summer and winter home ranges. In a given season, their home range seldom exceeds 5 km<sup>2</sup> to 10 km<sup>2</sup>.

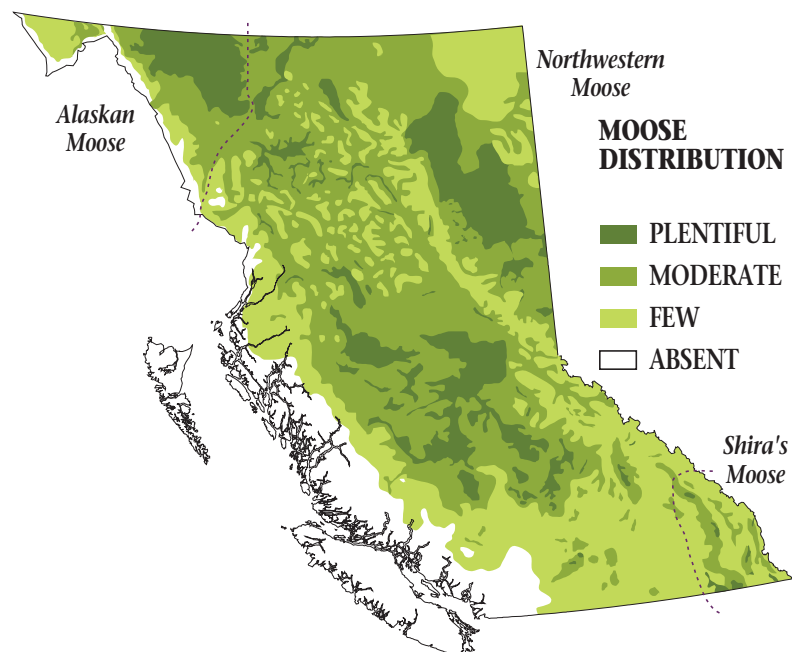


(Photo: Cantor, US National Park Service)

Adapted from: British Columbia Ministry of Environment, Lands and Parks, 2000, *Moose in British Columbia*, Victoria, 6pp.



**Map 2.9**



## 2.11 Porcupine (*Erethizon dorsatum*: ssp: *myops*, *nigrescens*)

### Appearance and Size

Porcupines have a short, stocky body. They have a short, blunt-nosed face with small eyes. The ears are small and round, almost concealed by the hair, which also covers the spines. The shoulders are humped, making the back look arched. The short legs are bowed, and the



(Photo: US National Park Service)

animal stands bear-like with its entire foot planted firmly on the ground. The claws are long and curved. The muscular tail is thick, short, and rounded at the tip.

The porcupine's coat consists of a soft, brown, woolly undercoat and coarse, long guard hairs. At the base, each guard hair is brown, becoming darker near the tip, which may be white in eastern populations and

yellow in the western ones. The guard hairs conceal the quills until the porcupine is aroused. The quills are longest on the back and tail and when raised push the guard hairs forward, forming a crest. On the face the quills are about 1.2 cm long; on the back they may be up to 12.5 cm in length. There are no quills on the muzzle, legs, or underparts of the body. Next to the beaver, the porcupine is Canada's second largest rodent. Adult males reach an average weight of 5.5 kg after six years; the females reach 4.5 kg. The total length averages 68 cm to 100 cm, and the height at the shoulders is about 30 cm.

### Life History

Porcupines are solitary animals. Porcupines first breed when they are one or two years old. In the southern part of their range, they mate in September. In the more northerly latitudes, they mate in late October to November. The gestation period is about 7 to 8 months. Birth occurs sometime between March and May depending how far north the porcupine is located. Single births are most common and twins are almost unknown. After a couple of days, the baby porcupine can climb, although it tends to spend more time on the ground. After a week or so, the female leaves the baby



(Photo: Tom Hall)



(Photo: US National Park Service)



(Stock Photo)



for longer and longer periods while she feeds on the emerging green plants. Weaning, or making the transition from mother's milk to other food, takes seven to ten days. By the Fall, most young porcupines live apart from their mothers.

### Abundance and Distribution

Except for Vancouver Island, the Gulf Islands, and the Queen Charlotte Islands, Porcupines can be found throughout British Columbia.

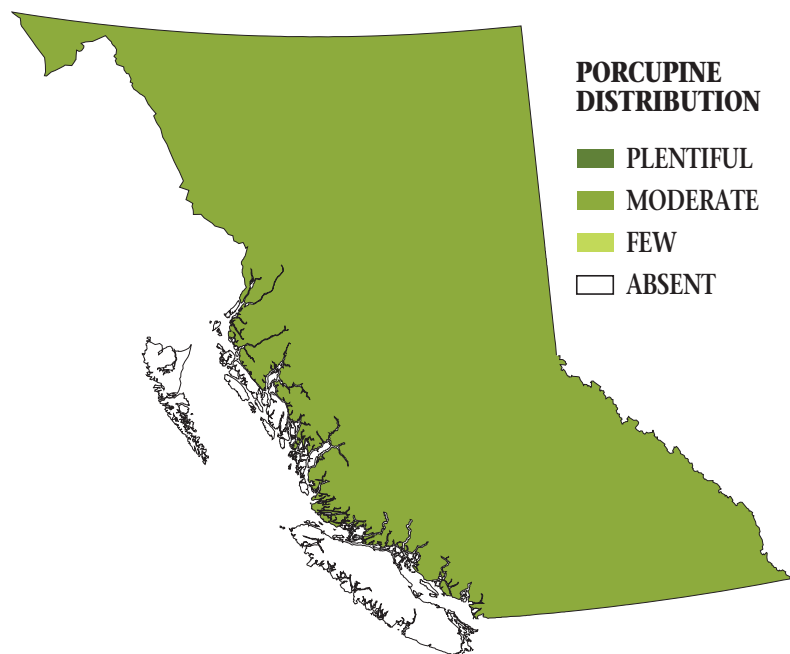
Adapted from: Canadian Wildlife Service, 1993, *Hinterland Who's Who, Mammals: Porcupine*, Ottawa, Ontario



(Photo: Mary Meagher, US National Park Service)



Map 2.10



## 2.12 Bighorn Sheep (*Ovis canadensis*, *Ovis dalli*: ssp: *dalli*, *stonei*)

### Appearance and Size

California and Rocky Mountain bighorns look similar, but the California subspecies is slightly darker in colour, and in rams the horns flare outward more than those of Rocky Mountain rams. Bighorn Sheep have a rich brown coat with a contrasting ivory-white rump patch, a white muzzle, and white trim on the back of all four legs. The brown coat fades to a drab



(Photo: William S. Keller, US National Park Service)

grey-brown by late winter.

The adult ram's massive, brown, spiralled horns grow throughout the sheep's life, and can be as long as 127 cm around the curve and as thick as 40 cm around the base. Ewes have slightly curved horns about 30 cm long. Adult rams stand about 100 cm high at the shoulder, and usually weigh 90 kg to 135 kg. Ewes are about two thirds the size of rams.



(Photo: BC Parks)

### Life History

Bighorn Sheep are among the most social of British Columbia's hoofed mammals. They breed between early November and mid-December. Most ewes do not breed until they are two years old and rams until they are seven or eight years old. Gestation lasts about 6 months, and lambs are born from the last week in April to early June. As lambing time nears, pregnant ewes leave their social group and isolate themselves in rugged lambing cliffs near the winter-spring range. They usually produce a single lamb that weighs 3 kg to 5 kg, but some well-nourished females produce



(Photo: J. Schmidt, US National Park Service)



(Photo: Tourism BC)

occasional twins. Bighorn Sheep can live as long as 20 years, but most do not live beyond 12 to 14 years.

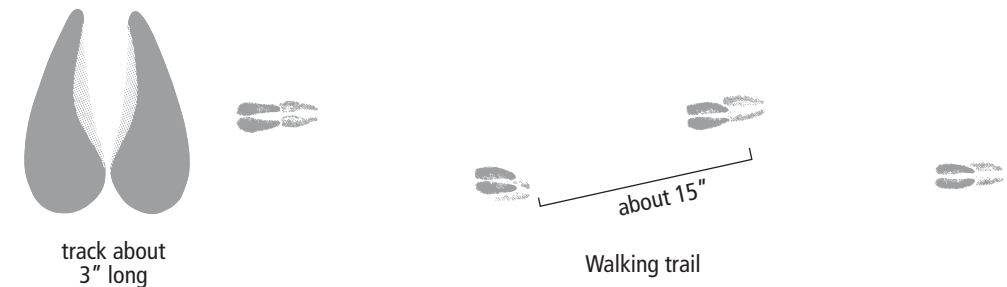


## Abundance and Distribution

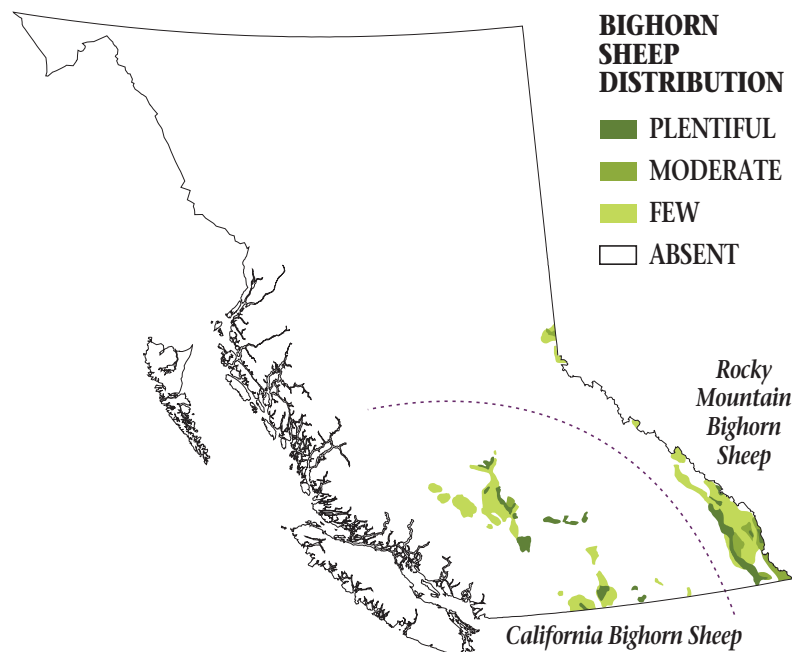
The main native herds of California Bighorns total about 3000 animals. They occur in the Okanagan area (Ashnola, Vaseaux Lake-Penticton Creek, Shorts Creek); on the east side of the Fraser River from Lillooet to Williams Lake; west of the Fraser around Churn and Lone Cabin Creeks; in the Bridge River watershed; in the Taseko Lake-Chilko Lake area; and at the Junction of the Chilcotin and Fraser Rivers. California Bighorns have been introduced in a number of locations, including the Grand Forks area, Kamloops Lake, and Dog Creek. There are about 2500 Rocky Mountain Bighorns. In the East Kootenay region, their herds occur in the Kootenay ranges on the east side of the Rocky Mountain Trench, from Radium south to Bull River; the Galton Range on the east side of the Trench from Elko to the Montana border; the Front ranges along the west side of the Elk River north of Sparwood; the west slope of the Rockies from Crowsnest Pass to Fording River; and the Kootenay River headwaters near Mount Assiniboine Park. More isolated herds also occur near Golden and north of McBride. New herds have been established near Chase, Castlegar, and Spences Bridge, which are outside of the historic range of this subspecies, and animals from an introduction in Washington State have spread into the Salmo area.



(Photo: Jim Turner, BC Ministry of Transportation and Infrastructure)



**Map 2.11**



## 2.13 Wolf (*Canis lupus: ssp: nubilus, occidentalis*)

### Appearance and Size

Wolves in British Columbia vary in colour. A single pack may contain animals that are black, white, shades of grey-brown and tan, but never spotted. Wolf colors vary widely, and solid-colored wolves are common. They are often a grizzled grey-brown, similar to some German



(Stock Photo)

shepherd dogs. A wolf's winter coat is very woolly, and can be two and one-half inches thick with individual hairs as long as five inches. Dogs descended from wolves. Consequently, for some breeds, they appear similar. Wolves have longer legs, bigger feet, and a narrower chests than large domestic dogs. While a domestic dog's tail may curl, a wolf's tail does not.

### Life History

Wolves are social animals: they not only hunt in packs or groups but live most of their lives with other wolves. The wolves' habit of hunting in packs has resulted in the development of complex patterns of social behaviour. Wolves differ from domestic dogs in their reproductive cycles. Male dogs can breed at any time of year and females every six months, whereas both male and female wolves in the wild can breed only once a year. Wolves usually reach sexual maturity in their second year. It is possible for younger animals to have pups, but this is not normally the case. Breeding time varies with the latitude but most commonly occurs in March and April. After a nine-week gestation, litters of five or six pups (sometimes eight or more) are born. The pups remain inside



(Stock Photos)



whelping dens for approximately two weeks. By mid-autumn they are travelling with the pack and participating in hunting and other pack activities.



(Photo: BC Parks)



## Abundance and Distribution

Wolves are territorial. The sizes of their territories vary greatly and are dependent on the kind and abundance of prey available. The pack bond is strongest during winter, when the wolves travel and hunt together. In summer, when the pups are young, the adults seldom go on long forays. They may hunt together occasionally after meeting at the den or home site where the pups are being cared for. Wolves are common in lightly settled portions of British Columbia.



Front track  
about 4 1/2" long



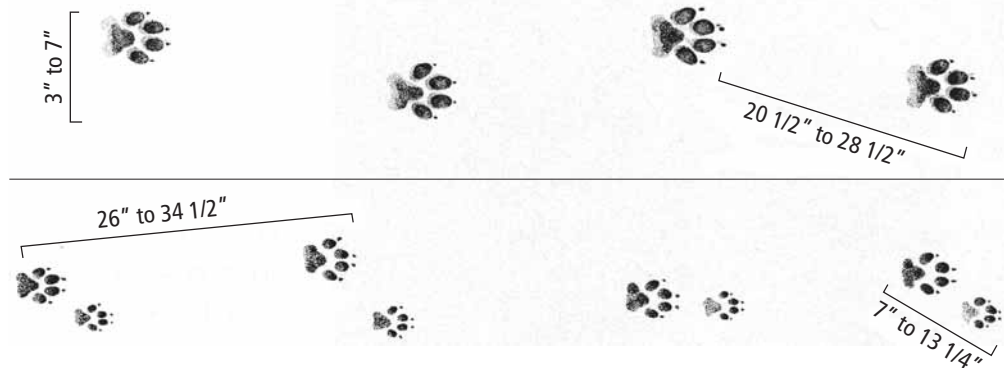
Hind track  
about 3 3/4" long

Adapted from: Canadian Wildlife Service, 1993, *Hinterland Who's Who, Mammals: Wolf*, Ottawa, Ontario and National Park Service, 2004 *Wolves in the North Cascades*, North Cascades National Park, Sedro Woolley, Washington.



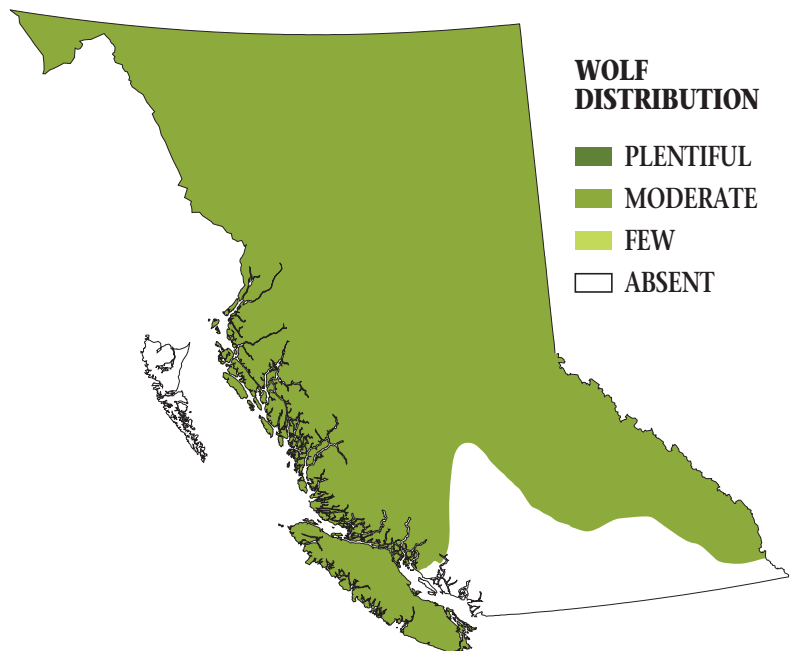
(Photo: Barry O'Neill, US National Park Service)

Wolves are mostly direct-registering animals in their alternating walking gait. Their trail width is usually wider than that of coyotes, but the two animals' stride lengths overlap substantially.



Gray wolves tend to leave irregular trotting patterns. The configuration of the tracks and their spacing within each group vary considerably. The smaller hind track leads the front track in each set of tracks.

**Map 2.12**



## 2.14 North American Badger (*Taxidea taxus*)

### Appearance and Size

Badgers are shaggy, stout, short-legged animals, with characteristic black and white facial markings and a short tail. They have long curved claws upwards of 5 cm long well-suited for burrowing on their front legs, and teeth designed for tearing and shearing flesh. Their upper



(Photo: Tom Hall)

torso fur ranges in colour from silver grey to yellow-brown, interspersed with black and buff. The feet and lower legs of badgers are black. The markings of both sexes are similar. They have a squat, flattened appearance because they have short fur on their backs and longer fur on their sides. They are amongst the largest species in the weasel family. Mature badgers range in length from 65 to 90 centimetres, and in weight from 6 to 14 kilograms. Adult males are slightly larger and heavier than females.

### Life History

Except when females are raising young, and for brief encounters between mating pairs, badgers are relatively solitary and nocturnal animals. Mating occurs between July and August. While only yearling or older males breed. Upwards of 40 percent of juvenile females, as well as yearling and older females will breed. Females can reach sexual maturity as young as four to five months. After delayed implantation, but rapid gestation, young



(Photo: Tom Hall)



(Photo: Tom Hall)

are born in March or April of the following year. Litters are limited to one each year, ranging in size from one to four kits. Newborn badgers are nursed for five to six weeks, after which their mothers begin to bring prey to them. After being raised by their mothers for up to twelve weeks, juvenile badgers begin leaving to search for their own home ranges.



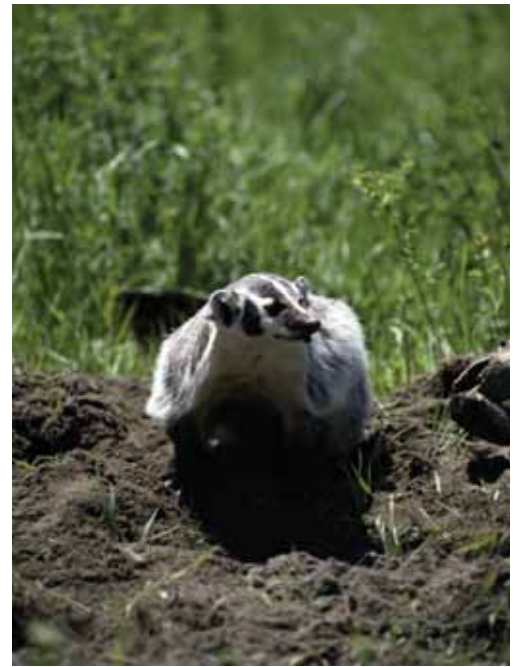
(Stock Photo)



## Abundance and Distribution

It is estimated that there are less than 200 breeding adults in British Columbia. This small population is distributed very thinly. While the home ranges for female adults average 50 square miles, the home ranges for adult males can extend to upwards of 500 square kilometres. Although badgers occur primarily in the dry southern interior valleys of the Okanagan-Similkameen and Kootenays, they have been sighted as far west as Manning Park and as far north as Williams Lake and Clearwater. Badgers are very vulnerable to human development and have recently been placed on the Provincial Red List for threatened and endangered species.

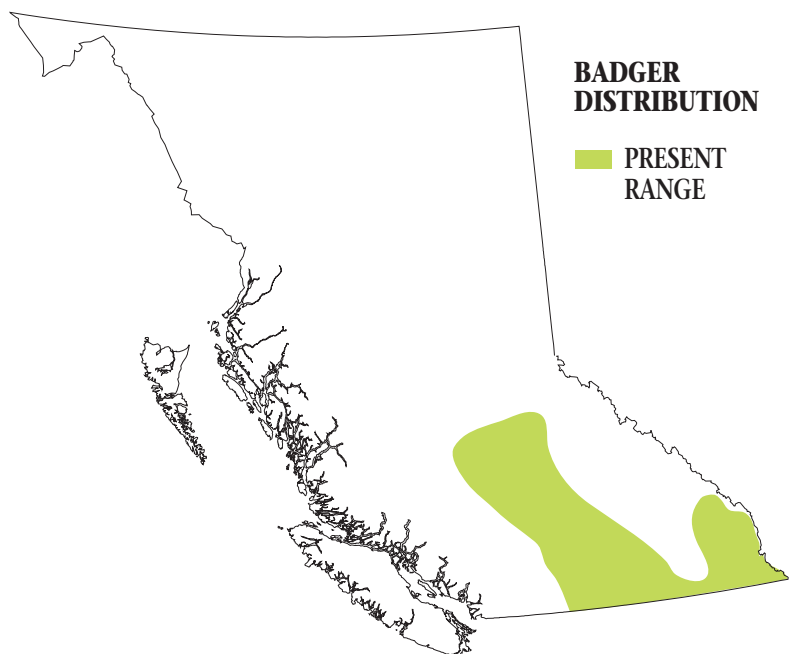
Adapted from: British Columbia Ministry of Water, Land and Air Protection, 2002, Badger, Victoria, 6pp.



(Stock Photo))



**Map 2.13**



## 2.15 Bison (*Bison bison*: ssp: *athabasca*, *bison*)

### Appearance and Size

Bison are recognizable by their large size, massive forequarters, shoulder hump, large woolly bearded head, short black horns, and distinctive long tasseled tail. Adult bison have thick coats ranging in colour from coppery brown to dark brown. Young bison are reddish brown



(Stock Photo)

for the first two to three months of their lives. Wood bison (*Bison bison athabasca*) are slightly larger and darker than Plains Bison (*Bison bison bison*), with a more pronounced shoulder hump and shorter hair on the neck and forelegs. Bison are the largest wild land mammals in North America. A typical mature bull can exceed 2 metres in height and weigh between 550 and 900 kilograms. The heaviest wild male Wood Bison recorded was 1031 kilograms. Adult female bison can exceed 1.5 metres in height and weigh between 320 and 545 kilograms. Adult males have thicker horns, more prominent humps and bushier hair on the forehead, chin and neck than adult females.

### Life History

In disease-free herds with low levels of predation, bison can have high reproduction rates. Well-nourished females can reach reproductive maturity in one year but usually first conceive when three to five years old. Females rarely produce a calf every year. Calves are born from mid-April to early June, after a 9.5 month gestation period. At birth, calves weigh between 15 and 25 kilograms. In captivity, bison have been reported to live as long as 30 years. Most wild bison live an average of 10 to 15 years, with few surviving 20 years.



(Tom Hall)



(Stock Photo)



(Tom Hall)



## Abundance and Distribution

For most of the year, bison congregate in herds of adult females, subadults and calves. While mature bulls usually form smaller bachelor groups, lone bulls are relatively common. In northern areas, mating (rutting) may extend from July to September, when groups of cows and bulls mix. Grasses and sedges constitute about 85 percent of the typical Wood Bison diet, with herbs making up the remaining 15 percent. In spring, Wood Bison usually forage in arid, grassy meadows and shrubby savannahs. Bison are rare in British Columbia, and Wood Bison are on British Columbia's Red List of species. Once extirpated, approximately 200 Wood Bison are estimated to exist in isolated pockets in the northeast corner of the province. Two herds of Wood Bison are located north of Nordquist Flats, along the Liard and Beaver rivers, near the Yukon-Northwest Territory border; and one herd is located at Etthithun Lake near the Alberta border. Occasionally, animals from the Hay-Zama herd in Alberta wander into British Columbia along the Hay River. Plains Bison are more numerous than Wood Bison, and over 1000 can be found in the vicinity of the Alaska Highway near Pink Mountain.



(Photo: Dave Dickson, ICBC)

Adapted from: British Columbia Ministry of Water, Land and Air Protection, 2002, *Bison in British Columbia*, Victoria, 6pp. and British Columbia Ministry of Water, Land and Air Protection, 2002, *Wood Bison*, Victoria, 6pp.



**Map 2.14**

